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Improving Patient Safety Through Accurate Medication Reconciliation

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Prospectus Elements

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Clinical Leadership Theme

A medication error can occur anywhere in a patient's journey, especially since many different types of health professionals are involved in the process of medication administration. The National Patient Safety Agency (NPSA) reported that 1 in 10 patients experienced medication-related errors (NPSA, 2007). I have decided to focus on standardizing medication reconciliation as part of the national patient safety goal of using medications safely (Joint Commission, 2014). The clinical leadership theme my project is associated with is the Clinical Outcomes Management, educator role. We will be using teaching and learning techniques and incorporating best practices into our electronic health records and technology, in order to facilitate learning from the staff nurses. As a Clinical Nurse Leader (CNL), I will be managing the education and learning process for the new standardized process as well as evaluating the outcomes.

Statement of the Problem

71 % of medication errors that result in fatality or serious harm are due to unclear prescriptions, wrong doses and frequency, drugs being omitted, and medication being delayed (NPSA, 2007). When these inconsistencies line up, as in the Swiss cheese model, the holes allow problems to pass through each layer and cause potential harm to the patient.

Project overview

The goal of the project, by standardizing medication reconciliation for registered nurses, is to have 80% of all medication reconciliations to be accurate and a decrease in medication error related safety incident reports to no more than 21 per fiscal year. This would represent a 50%

improvement from last fiscal year. With these improvements, we will be aligned with one of the 2015 Joint Commission National Patient Safety Goals (2014) of using medications safely.

Rationale

When I started analyzing the problem of medication errors on our unit, using a fishbone diagram (Figure 1), I found that we had many causes and this problem was complex and multi-layered. On the positive, we had staff who voiced that they were interested in improving our overall medication safety on the unit and volunteered to be a part of our medication administration task force. We performed a unit-based audit, which included patient identifiers, purpose of medications explained, and bar code scanning. We discovered that we were only compliant 40 % of the time. I then examined each patient's medication reconciliations for each day and found that no two patient's medication reconciliations were done the same way. We had variance in deleting medications if a patient was no longer taking them versus documenting the last dose as "unknown". We also had discrepancies in adding free text notes to the medication if the dosage was different than what was listed, versus deleting the medication and entering it as a new medication with the correct dose. We had two safety events in one day related to incorrect medication reconciliation that took over an hour to resolve, delaying care and decreasing patient safety and satisfaction, as well as decreased nurse satisfaction. While performing a SWOT analysis, I found our strengths include clinically experienced nurses, both in outpatient and inpatient settings, which provides a diverse set of skills on our unit. Our nurses also give exceptionally compassionate care and have been recognized with hospital and national awards. This is displayed in many of our Press Ganey patient satisfaction survey results. Our weaknesses include the resistance or hesitance to change the current workflow in order to meet new needs of

the unit. The opportunities for this project are to meet one of the Joint Commission National Patient Safety Goals for 2015: use medications safely (Joint Commission 2014). The threats to this project are that the new standardized workflow and expectations may increase time required to complete tasks such as medication administration. We will be able to analyze our data with auditing the documentation in the electronic health record system by using reports as well as monitoring our safety incident reporting system frequency. By performing a value stream map of the process, we were able to identify the different layers of the issue (Figure 2) and noted that the RN is the first line of defense as well as the last line of defense with medication safety.

When providing a cost benefit analysis, I found costs included the time involved with consultation of pharmacy, EPIC (electronic health record system), medication administration task force meetings with staff committee, and researching at other large Magnet institutions for best practices. This was approximately 120 hours of work for me and approximately $9240. Costs also included the education to staff from staff, separate cost of out of count time for "super users" to teach the workflow to staff, approximately 100 hours, divided by 4 "super users", average hourly rate is $73/hour= $7300 total for super user time

The benefits include improved patient safety with improving accuracy of medication reconciliation during the pre-operative admission process; improved effectiveness of nursing care with standardization of medication reconciliation done by creating a standard work flow which will guarantee the same results, every time; improve patient satisfaction by including patient in medication reconciliation and medication administration, as part of the Joint Commission National Patient Safety Goals of 2015: Use Medications Safely (Joint Commission, 2014). E-prescribing systems have been found to reduce medication errors by 85% and a net

cost savings of $400K in ambulatory settings, which my microsystem falls under (Burton et al, 2007). Bar Code Electronic Medication Administration System saved a large academic hospital $2.2M each year (Maviglia et. al, 2007). Stanford Health Care is considered a large academic hospital, which is my organization. The net benefit is using the $400 K savings listed above (Burton et al, 2007) and the costs of research and education, equaling $16,540 as a one-time cost, which means the net benefit of implementing this practice would be approximately $380, 000. Qualitative benefits are just as important as quantitative and include autonomy of nurses to be able to perform their nursing role with the education and best practices behind their practice, improved patient outcomes over long term, decreased costs associated to incorrect medication prescription and administration, improved patient satisfaction and increased patient involvement, and finally, decreased time of management involvement with investigation of medication errors due to decrease in medication errors

Methodology

The microsystem we are studying is an outpatient unit for cath angio pre and post procedure patients that sees approximately 40 to 50 patients daily and has an overnight observation unit. We have been examining the complex problem of medication administration errors and found there are inconsistencies with administration of medications and explaining the purpose of medications, using the bar coding and asking for 2 identifiers, as well as documenting medication reconciliation. We do the medication reconciliation for each patient upon admission. Since it is documented in our electronic health record system, it is easy to track-versus nurses explaining medications verbally and using 2 identifiers. It has a great impact because it affects the entire patient's stay and it is difficult to ascertain patients' medications

after the procedure when they are post sedation. I have collaborated with staff nurses, pharmacy and now IT. It seems that medication reconciliation is something the organization is looking at standardizing. We will be developing a standard work process or guidelines for all RNs who complete medication reconciliation upon admission to follow. We will be able run reports in EPIC and see if our standard work has been followed. To track improvement, we are working with the pharmacy to identify if we have had less errors and incorrect reconciliations with our safety event reporting system. We will know if we are effective if we can reach and sustain 80% of all medications being reconciled correctly, in adjunct with a 50% decrease in safety event reports for the fiscal year 2016.

As far as introducing this change, I will be utilizing John Kotter's theory. When I first went into management, I read the book "Our Iceberg is Melting: Changing and Succeeding Under Any Conditions" (Kotter, 2005), whose change theory includes eight steps. I try to use this theory whenever implementing a large-scale change. For my project, I established a sense of urgency when we had a near miss medication event by a well-respected and thorough nurse on our unit. She wanted to share her experience and mistake with the staff in hopes to improve our practice. Her presentation brought up many opportunities of improvement for our unit. Staff expressed awareness of the issue and I was able to create a powerful coalition of staff nurses interested in improving this issue. We have been meeting regularly and developed a vision of what issues are occurring and what our future state should be. These members are my informal leaders and are responsible in assisting me with communicating this vision. As staff nurses and informal leaders, they are respected and trusted by their peers and I have full confidence in their ability to empower others in our shared vision. With this project, as well as other responsibilities

of a manager, I try to be aligned with transformational leadership and give power to our staff in order to empower them and engage them.

Our project task force has been working with pharmacy and our electronic health record (EPIC) team in order to create short term wins for our larger issue. It is a slow process as the problem has many layers, and if we continue to celebrate the small wins then we will continue to keep our staff engaged. This is part of the Clinical Nurse Leader (CNL) American Association of Colleges of Nursing (AACN)'s competency to "demonstrate effective communication, collaboration, and interpersonal relationships with members of the care delivery team across the continuum of care" (AACN, 2013). With the project fully implemented, we will continue to review our progress in our daily huddles as part of the Plan-Do-Check-Act (PDCA) cycle and readjust as needed after the checking portion of the cycle. Once we have a revised, staff approved and tested standard work, we can use it seamlessly and it should not add time or tasks to the nurses' work.

Data Source/Literature Review

The focus of my study has been unit assessment information and unit based, staff driven audits as well as a patient satisfaction story related to a medication error. It is appropriate for us to look into because we have a high frequency of medication reconciliations daily since we are a high volume outpatient unit. Also, as part of an organization overseen by the Joint Commission, it is important that we address their National Patient Safety Goals, which include medication safety. In order to find research on this topic, I used a PICO search. The term PICO stands for:

- P: Patient/Population : Who or What disease?

- Outpatients in a Cath Angio Department

- I: Intervention : Treatment of interest

  - Accurate Medication Reconciliation with patient including purpose/indication of each medication

- C: Comparison : Alternative/standard treatment

  - Current state- frequent (5-10 per week) discrepancies regarding medication reconciliation

- O: Outcome : What are you trying to accomplish, measure, improve, effect?

  - Improving patient safety by minimizing medication reconciliation discrepancies at admission, in order for patient to receive accurate medications through stay and post discharge

I used Lane Library with Stanford University to perform a PICO search. Using the terms "heart disease" for patient populations (as most Cath Angio patients are here with heart disease) and "medication reconciliation" in intervention and "safety" in outcomes, I didn't find any relevant articles right away.

Using the term "Medication Reconciliation" and "Safety", I was able to find an article on medication reconciliation at admission and discharge, which is more specific to what I am looking for. I tried fewer categories (I and O of PICO) to see what resulted. Since our unit is

very unique, as we care for 5 different interventional services, it is hard to find like units. I will continue to test out the different categories in PICO to see what the best outcome is.

In the article "Medication reconciliation at admission and discharge: an analysis of prevalence and associated risk factors", authors Belda-Rustarazo, Cantero-Hinojosa, Salmeron-Garcia, Gonzalez-Garcia, Cabeza- Barrera and Galvez (2015), recognize medication errors as a "major cause of morbidity" and medication reconciliation as a strategy to prevent errors at points of care transition. The two-year study encompassed 814 patients and the most occurring error was drug omission. Risk factors were evaluated for each reconciliation.

In the article "Clinical and Financial Impact of Pharmacist Involvement in Discharge Medication Reconciliation at an Academic Medical Center: A Prospective Pilot Study", Sebaaly et. al, 2015, the authors who are all pharmacists, also stress that medication reconciliation is challenging. The study focused on the role of pharmacists in medication reconciliation, specifically discharges. It found the impact of pharmacy involvement and evaluation of medications upon discharge was significant in decreasing errors in a total of 77 patients in a large academic facility. Our microsystem has increased our usage of pharmacists during discharge education for anticoagulation medications. The qualitative results included staff stating they learned a lot about the new anticoagulation medications and the pharmacists have been very helpful to both patients and nurses.

In the article "Discharge Time Out: An Innovative Nurse Driven Protocol for Medication Reconciliation" by Ruggiero et. al, 2014, researchers stated that a retrospective 2012 study showed that 71.2% of hospital discharges had at least one medication reconciliation error. The nurses at the University of Pennsylvania Hospital developed a time out process at discharge,

based on evidence-based practice. Pre implementation showed 77% of discrepancies upon discharge. Post implementation showed 21% of discrepancies upon discharge. This discharge time out can be easily integrated into nursing practice. We used this time out idea in our standard work and will train our staff to consider the discharge teaching to be considered an important aspect of our nursing care and treat it as important as time outs for procedures.

In the article "Impact of medication reconciliation and review on clinical outcomes" by Lehnbom et. al, 2014, the authors examined the effect of medication reconciliation on clinical outcomes in acute care settings, community settings and long-term facilities. The authors performed a systematic review of 83 research articles. While medication reconciliation can identify discrepancies and decrease harm to patients, there was little evidence on how they impacted clinical outcomes.

In the article "A Quantitative Evaluation of Medication Histories and Reconciliation by Discipline, authors Kramer et. al, 2014, examined the different disciplines involved in medication reconciliation. Registered nurses, pharmacy technicians and pharmacists were all involved in the admission medication reconciliation and the patients had their admission reconciliation taken 3 different types, one by each discipline. The study showed that having a pharmacist review the medication reconciliation would save the hospital $397 per patient.

In the article "Make Time for Medication Reconciliation" by Sarah Muegge, 2014, highlighted several medication discrepancies and the importance of care coordination amongst health care providers, also mentioning resources offered by the American Academy of Ambulatory Care Nursing. In her organization, it is encouraged that patients use the same pharmacy for all medication prescriptions in order to increase compliance and drug compatibility

safety. With this information and our electronic health record (EHR) system, we have been able to identify what pharmacies have prescribed medications and can contact the pharmacy if needed, by using the provided information.

Timeline

This project stemmed from safety issues occurring over the course of 2012-2015. In August, I performed an assessment of my microsystem as part of the initial planning stage in the PDCA cycle. The problem was multilayered and extremely complex. It has also evolved since August. During the planning stage, I formed a group of staff nurses who volunteered to be a part of the committee. We created a sense of urgency, according to John Kotter's change theory (Kotter, 2005) and assessed our current state with observations and a baseline audit (see appendix 3). We originally tried to meet weekly, for an hour, but encountered challenges with staffing as most of the nurses were scheduled to work. September started and five incident reports were filed, over the course of two weeks, in regards to inaccurate medication reconciliation and patients receiving the incorrect dosage or not receiving their medications. In September, we reached out to the pharmacy quality manager for assistance in medication reconciliation. During this meeting, we learned that there is no true standard for medication reconciliation in the organization and the organization's quality department is hoping to give this responsibility to physicians as the primary recorder of the medication reconciliation process. This has yet to be done and will prove difficult in the outpatient areas as we have many patients arriving at the same time and a limited time to perform all the necessary preoperative documentation before procedure. The quality manager then recommended us to the ITS Program Manager for EHR Business Continuity and Regulatory Compliance in order to obtain the standard documentation for

medication reconciliation. This person also delivers the medication barcode scanning reports. In October, we were able to have our microsystem added. In October, we continued to audit our incident reports for frequency of medication reconciliation errors. There have been none so far. In November, we have developed a tool, under the guidance of the quality department and ITS program manager, for nurses to use when reconciling medications. This will be used for preparation for our new hospital as well. We had our committee and five other staff members use the tool to test its effectiveness.

In December, we had hoped to implement the tool as part of the "do" step in the PDCA cycle. However, we are currently experiencing staffing shortages due to medical leaves and resignations so we have to postpone this step until January 2016. Early next year, we will check our progress and reevaluate the tool and process. While we are focusing on medication reconciliation, we are starting to make progress in other areas of our multi-layered problem of medication administration. The staff is celebrating the small successes, which is another step in Kotter's change theory. This timeline is illustrated in Figure 4.

Expected Results

As far as expected results, we have started to note some immeasurable ones thus far. Bringing visibility to this issue has begun the conversation of medication safety, including specifically medication reconciliation and examining our process rather than blaming others. There has been a shift in our culture to examine gaps or deviations in our standard process in order to create a streamlined workflow. As far as measurable expected results, I hope to see a 50% improvement in medication error related incident reports to 21 per fiscal year as well as be

compliant with 80% of our medication reconciliations according to the tool. We have not had any reports in the month of October or in November, so far.

From the tool evaluation responses, all staff that tried the guide found it to be helpful. They wish to have more than one week to review it and see if there may be any more revisions needed. We are very pleased with the progress so far.

Nursing Relevance

Nursing has evolved from assisting physicians to becoming autonomous, independent healthcare providers, advocating for patient safety. I have seen our nurses in our microsystem grow as transformational leaders and role based practitioners by identifying a gap in our microsystem, and analyzing in order to improve patient safety and nursing care. We have also discovered a problem that seems to be relevant in the rest of the organization, as we have yet to find clear examples of standard practice for medication reconciliation. With empowerment to make changes in our microsystem, nursing satisfaction will improve. As nursing satisfaction improves, patient outcomes improve (McHugh et. al, 2015), which is our overall goal.

Summary Report

The goal of my CNL project was to improve medication reconciliation accuracy by standardizing our medication reconciliation process. With improving accuracy in 80% of our medication reconciliations, I aim to decrease the safety report incidences by 50% to 21 reports per fiscal year. My microsystem is an outpatient pre operative and postoperative cath angio unit. We see an average of 40-50 patients daily.

Inspired by John Kotter's Change Theory(Kotter, 2005), I created a committee of staff members who wanted to improve medication errors on our unit. We used a fishbone diagram to first identify the causes of our inaccuracy with medication administration, including medication reconciliation. We then audited our staff during medication administration and reconciliation to identify the most common incorrect practices.

With the help of the data from our safety event incident reporting system, we were able to conclude that most errors arise from inconsistent medication reconciliation due to lack of education. I contacted our information technology trainer for more resources. She was able to provide current articles on medication administration for outpatient settings, located in our Internet site portal. After interviewing the staff during huddles, I learned that our staff do not utilize this portal as they find the site confusing, I drafted a guide using screenshots from our EHR system and asked our committee to review it and try it during a medication reconciliation process (*Figure 6*).

With their feedback and application trials, we revised it using the organization's standard work template (*Figure 7)*. Our innovators and early majority members were identified through either membership of the committee or daily huddle participation. Our committee asked these members to trial the standard work last week during the preoperative phase. All of the five participants, in addition to the four-committee members, stated they learned something new regarding the correct way to perform medication reconciliation (*Figure 5*). This confirmed our theory that most incorrect practices were due to lack of education. In order to resolve this issue, we are going to formally train our staff in early 2016 on the new standardized process of medication reconciliation, using our standard work, and the EHR playground in which staff members can test out how to document medication reconciliations on created patient profiles.

In order to be sustainable, this new standard work will also be implemented in our orientation information packet for new hires and preceptors will be expected to teach to this process, once the staff is educated. Our medication administration safety committee plans to meet monthly and then quarterly. Our committee represents the champions of this project for the frontline staff and will be serving as resources to other staff members. We are optimistic in the success of this standard work tool and its effectiveness to minimize errors with medication reconciliation.

Appendices

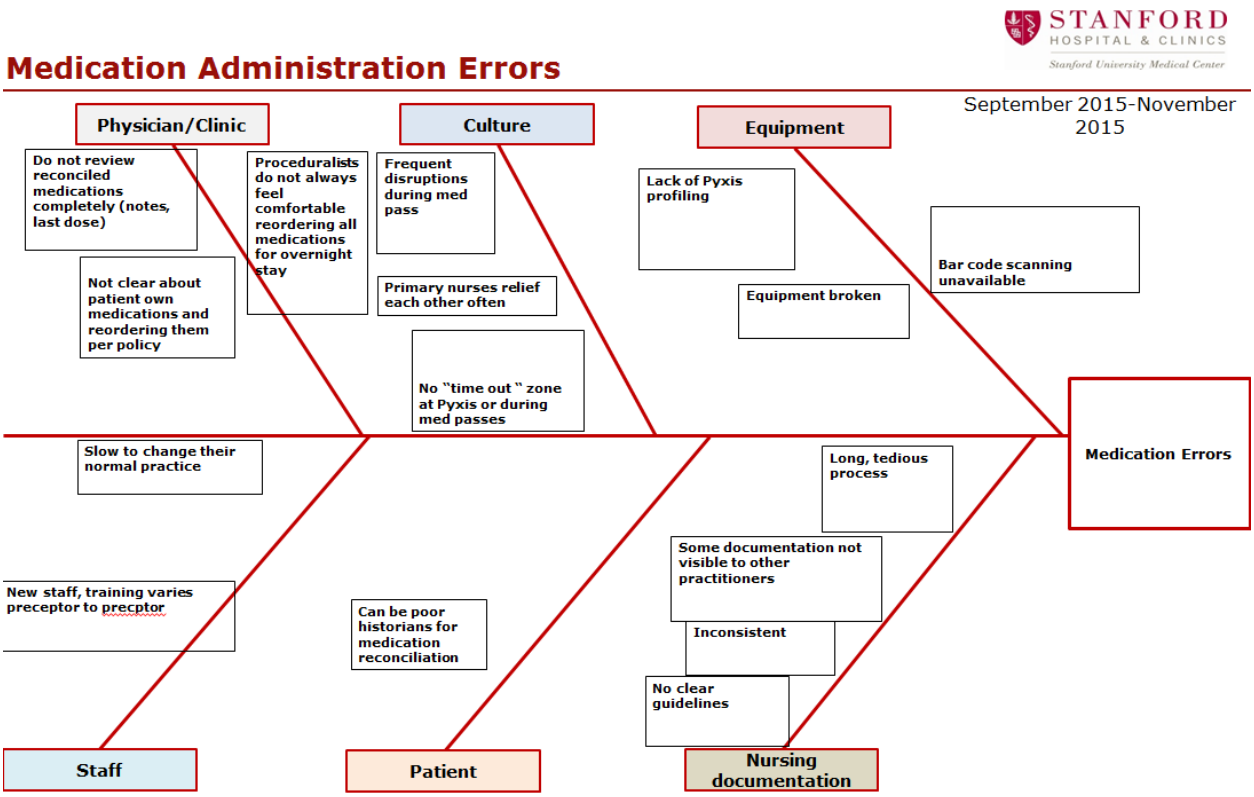


Figure 1. Fishbone diagram of the multiple causes of medication errors and specifically those related to medication reconciliation.

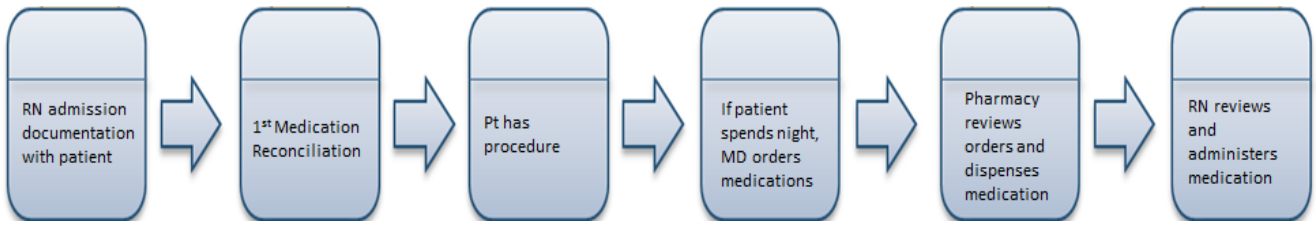


Figure 2. Process Value Stream Mapping of Medication Reconciliation in our microsystem, starting and ending with the registered nurse.

Audit Survey (please complete 5 and email to Dominique by 8/26/15)

Name of RN being observed: Date:

1. Were the 5 rights performed before medication administration?
    a. Yes b. No
2. Was the patient scanned?
    a. Yes b. No
3. Was the medication scanned?
    a. Yes b. No
4. Was the RN interrupted or distracted during medication pass (from pyxis to patient)?
    a. Yes b. No
5. If a pain medication was administered, was the baseline and post intervention pain level documented?
    a. Yes b. No

Figure 3: baseline medication administration audit for microsystem

August 2015	September 2015	October 2015	November 2015	December 2015	January 2016
assessment stage					
-audit, committee					
	1. incident reports filed regarding medication administration, focus changed to medication reconciliation as there was no consistent practice found during daily huddles with				

	staff 2. Met with pharmacy quality manager				
		contacted ITS Program Manager for EHR Business Continuity and Regulatory Compliance and Director of Patient Safety Operations & Transformation for guidance on standardization of medication reconciliation, continued to audit the incident reports			

		related to medication errors			
			Develop a tool for medication administration reconciliation		
				Implement tool with committee educating staff- start with early majority and innovators	
					Educate and Evaluate effectiveness of tool with survey for

					staff RNs, review during daily huddles

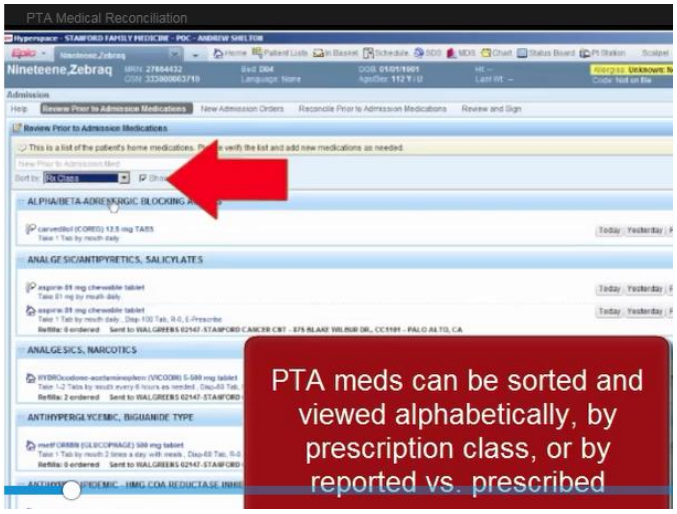
Figure 4 : Timeline for project

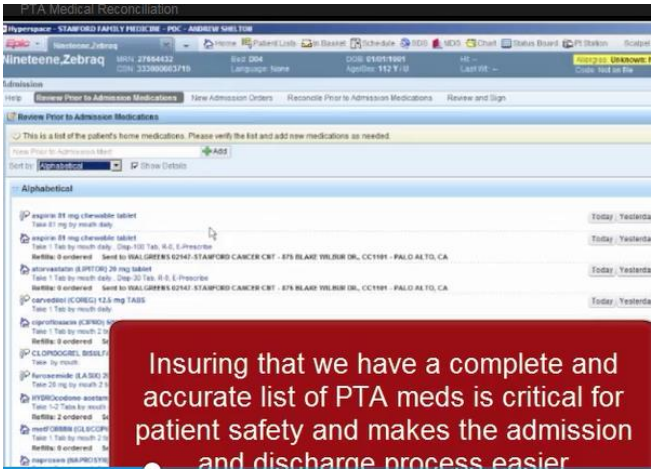
Evaluation tool for Medication Reconciliation Standard Work

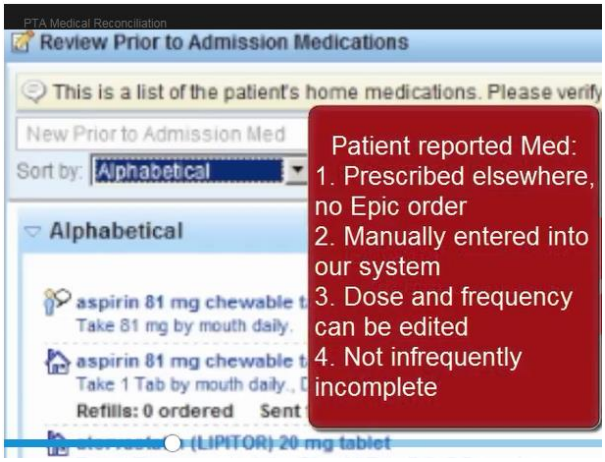
1. Please rate the effectiveness of the tool from 1 (least helpful) to 5 (extremely helpful) :
2. What did you find most helpful in standard work tool?
3. What did you find least helpful in standard work tool?
4. What would you like added to standard work tool?
5. What do you usually do if you have a question regarding medication reconciliation (resources, etc.)?

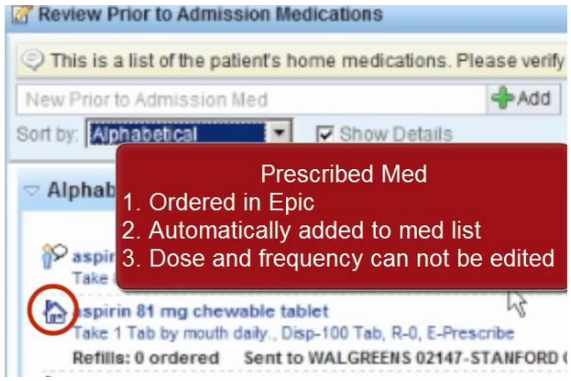
Figure 5: Evaluation tool for Medication Reconciliation Standard Work

Medication Reconciliation How To Guide









If there is a medication with no dosage, frequency, etc., delete it and enter complete medication with full dose, route, and frequency

If the medication was prescribed, we cannot change dosage, etc.

If it is a patient reported medication, we are able to change dosage, etc.

If patient reports he has never taken medication, delete it with erroneous entry as reason

When you are finished, you can "MARK AS COMPLETE" or incomplete if still missing medications, click add a note to specify if something is missing

Then "Mark as Reviewed"

If patient states they took the medication "a week ago" or "a month ago", etc. , please enter approximate date, otherwise it will show as unknown.

Figure 6: First Draft of Medication Reconciliation Guide

Process Description:

- **This standard work outlines the expectation and workflow for CAPR staff performing medication reconciliation during transfer of care phases: preop, post op and discharge**

Who Must Use this Process? :

- **This standard work should be used at all times by Registered Nurses**

Process and Detailed Steps

Outpatient arrives to CAPR

1. As part of pre op assessment, RN is to review medication reconciliation in the CAPR navigator
    a. Current medications listed- verify with patient to see if they are still taking
        i. Patient reported medication: visually represented by human icon by medication, can be edited
        ii. Prescribed medication: visually represented by house icon, ordered in EPIC, automatically added, cannot be edited only deleted when applicable
    b. If not taking a medication, use the "X" to remove. Medication can be viewed in historical tab
    c. Ask patient if they are taking any new medications not listed.
        i. Use the "New Home Med" search window to find medication and enter as much information as possible (name, dosage, frequency, last dose-enter specific date)
        ii. Review Rx dispenses tab in navigator. If a medication appears on list that is not correlated with order, add to medication list
2. Select status of this list : complete or incomplete. Add note if incomplete and as needed. This is important information for providers placing orders.
3. Mark as reviewed

Postoperative phase in CAPR

1. If patient is staying overnight, review medication reconciliation tab. Verify medications with patient and dose times.
    a. Ask treatment team to order medications if necessary. Escalate any pending issues regarding medications.
2. Upon discharge, review medications with patient from the After Visit Summary (AVS). If any new medications are ordered, print Micromedex information for patient and include in AVS.
    a. For new anticoagulation medications, the OR pharmacy can be contacted to provide education
    b. Perform "time out" before discharging patient to confirm all medications are correct and ordered for pick up

Figure 7: Medication Reconciliation Standard Work

References

American Association Of Colleges Of Nursing (2013). Competencies and curricular expectations for clinical nurse leaders.

Burton, M.M., Hope, C., Murray, M.D., et al. (2007). The cost of adverse drug events in ambulatory care. AMIA Annu Symp Proc, 90-93.

Edwards, S., & Axe, S. (2015). The 10 'R's of safe multidisciplinary drug administration. Nurse Prescribing, 13(8), 398-406 9p.

Joint Commission. (2014, November 14). Hospital: 2015 National Patient Safety Goals. Retrieved September 11, 2015, from http://www.jointcommission.org/standards_information/npsgs.aspx (Links to an external site.)

Kotter, J., & Rathgeber, H. (2005). Our Iceberg is Melting: Changing and Succeeding Under Any Conditions. New York, NY: Audio Renaissance.

Kramer, J. S., Stewart, M. R., Fogg, S. M., Schminke, B. C., Zackula, R. E., Nester, T. M., & ... Goertzen, K. W. (2014). A Quantitative Evaluation of Medication Histories and Reconciliation by Discipline. Hospital Pharmacy, 49(9), 826-838 13p. doi:10.1310/hpj4909-826

Lehnbom, E. C., Stewart, M. J., Manias, E., & Westbrook, J. I. (2014). Impact of medication reconciliation and review on clinical outcomes. The Annals Of Pharmacotherapy, 48(10), 1298-1312. doi:10.1177/1060028014543485

Maviglia, S.M., Yoo, J.Y., Franz, C., et al. (2007). Cost- benefit analysis of a hospital pharmacy bar code solution. Arch Intern Med, 167(8), 788-794.

Mchugh, M. D., Aiken, L. H., Eckenhoff, M. E., & Burns, L. R. (2015). Achieving Kaiser Permanente quality. Health Care Management Review, 1. doi:10.1097/hmr.0000000000000070

Muegge, S. (2014). Safety Corner: Make Time for Medication Reconciliation. AAACN Viewpoint, 36(3), 1-15 15p.

National Patients Safety Agency. (2007). Safety in Doses: Medication Safety Incidents in the NHS. Retrieved October 8, 2015, from http://www.nrls.npsa.nhs.uk/resources/?entryid45=61625

Nelson, E. C., Batalden, P. B., & Godfrey, M. M. (2007). 13. In Quality by design: A clinical microsystems approach(Kindle ed.). Lebanon, NH: Center for the Evaluative Clinical Sciences at Dartmouth.

Ruggiero, J., Smith, J., Copeland, J., & Boxer, B. (2015). Discharge Time Out: An Innovative Nurse-Driven Protocol for Medication Reconciliation. MEDSURG Nursing, 24(3), 165-172 8p.

Sebaaly, J., Parsons, L. B., Pilch, N. (., Bullington, W., Hayes, G. L., & Easterling, H. (2015). Clinical and Financial Impact of Pharmacist Involvement in Discharge Medication Reconciliation at an Academic Medical Center: A Prospective Pilot Study. Hospital Pharmacy, 50(6), 505-513 9p. doi:10.1310/hpj5006-505